



Putting Research to Work

WisDOT RD&T E-Newsletter, April 2005

Technical information for state DOT highway professionals

Prepared by CTC & Associates LLC

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Designing for the Future

Ohio DOT Finds Metal Pipe a Stable Alternative to Highway Bridge

Faced with a \$5 million estimate for building a bridge over a creek, Ohio DOT engineers proposed using a large-diameter corrugated metal culvert instead, at a cost of only \$1.6 million including labor. Because the site required 75 feet of fill above the pipe to connect the terrain on both sides of the creek, ODOT has been monitoring deflection and pressure around the pipe, and has found it to be stable since its installation in 2001. Read more in ODOT's research newsletter at <http://www.dot.state.oh.us/divplan/research/newsletter/2005/Winter2005.pdf>.

Longer Spans for Beam-in-Slab Bridges

Researchers at Iowa State University's Bridge Engineering Center have modified design specifications for low-volume beam-in-slab bridges, increasing the design's maximum length from 50 feet to 80 feet. Modifications include using an alternative shear connector between the steel beams and the concrete deck, and incorporating a transverse arch that reduces the amount of reinforcement required. The modified design can be built by county crews with minimal equipment and at lower cost than conventional designs for similar applications. See the article in Iowa State's *Tech News* technology transfer publication at http://www.ctre.iastate.edu/pubs/tech_news/2005/jan-feb/long_span_bridges.htm.

GIS Database Optimizes Oregon's Environmental Justice Activities

Oregon DOT's new Geographic Information System database is streamlining the agency's efforts to comply with federal environmental justice regulations. Using U.S. Census data, the database identifies areas with low-income and minority populations, as well as the elderly, disabled and those dependent upon public transportation. See the research brief at http://www.oregon.gov/ODOT/TD/TP_RES/research_notes/rsn05-07.pdf, and read the final report at http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/EnvirJustRpt.pdf.

CSS Elements Improve Commuters' Experience

Iowa and Washington State DOTs are using context-sensitive solutions to add interest to two highway projects. In Des Moines, engineers are using delta-shaped piers on some bridges to let in more light; other bridges will include steel girders with a weathered look or concrete coated with white sealant. See <http://desmoinesregister.com/apps/pbcs.dll/article?AID=/20050227/BUSINESS03/502270324/1029/BUSINESS>. On I-405 in Washington, designers are exploring using earth tones in overpasses and sidewalks, and adding nature-themed designs to concrete forms. See http://seattletimes.nwsources.com/html/eastsidenews/2002196656_405style02e.html.

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Previous issues are available at <http://www.dot.wisconsin.gov/library/publications/format/newsletters/rdt.htm>.

Other e-newsletters for transportation professionals:

TRB E-Newsletter from the Transportation Research Board: <http://gulliver.trb.org/news/>.

The AASHTO Journal from the American Association of State Highway and Transportation Officials: <http://www.transportation.org/publications/journal.nsf>.

CTS Research E-News from the University of Minnesota: <http://www.cts.umn.edu/publications/enews/>.

Texas Transportation Researcher from TAMU's Texas Transportation Institute: <http://tti.tamu.edu/researcher/>.

Austroroads Newsletter from Austroroads: http://www.austroroads.com.au/austroroads_newsletter.html.

Transportation Communications Newsletter: <http://groups.yahoo.com/group/transport-communications/>.

Construction and Materials Innovations

FHWA Guidelines for Sign Supports Reinforce WisDOT's Findings

New FHWA directives echo a recent Wisconsin Highway Research Program study in identifying fabrication and erection errors as typical culprits in failures of sign and luminaire support structures. Evaluating the design, construction, erection and maintenance of such structures, the FHWA report calls for careful inspection for cracks that may originate during welding or galvanization, a recommendation likewise made in the Wisconsin study. The FHWA guidelines also cite anchor bolt inspection protocols used by a Sauk City firm. Read the guidelines at <http://www.fhwa.dot.gov/bridge/signinspection.pdf>, and see the WHP report and research brief at <http://www.dot.wisconsin.gov/library/research/reports/structures.htm>.

MoDOT Protects Endangered Fish During Construction

During a highway expansion project, Missouri DOT is using innovative methods to avoid disturbing adjacent streams, thereby protecting the habitat of endangered fish species. Construction crews have built special abutments, put in rock dams, and temporarily carpeted vulnerable banks to strain silt from water runoff. Many of these efforts will be used in a research project investigating silt-control methods. Read the article in the *Springfield News-Leader* at <http://springfield.news-leader.com/specialreports/stewardshipozarks/20050317-Newroad,threate.html>.

Mississippi: Paving Fabrics May Protect Asphalt Overlays

A recent Mississippi DOT project studied the use of paving fabrics between old concrete and new asphalt overlays to reduce reflective cracking in the overlays. The research found the technique to be most successful in warmer climates, with thicker overlays, and when used to combat load-related fatigue distress rather than thermal cracking. Read the final report at <http://www.mdot.state.ms.us/research/pdf/PavFabr.pdf>.

High-Performance Concrete Study Finds Best Mix, Curing Method

A recent Ohio DOT study tested three high-performance concrete sections that employed different curing techniques. The best mix used 30% furnace slag, which is expected to enhance pavement lifetime as well as providing recycling for the waste material. The study also found that water curing produced the least warp, and membrane curing the least deflection. See the research brief at <http://www.dot.state.oh.us/research/2005/Pavement/14809-ES.PDF>, and read the final report at <http://www.dot.state.oh.us/research/2005/Pavement/14809-FR.PDF>.

To Prevent Large Shrinkage Cracks, City Turns to Microcracking

In an effort to minimize shrinkage cracking, contractors in La Quinta, Calif., are laying a mile of asphalt over a microcracked soil-cement base, a process that is expected to cut the pavement's lifetime maintenance cost in half. The existing concrete will be rubblized, then covered with a slurry and aggregate-soil mixture. Shortly after, a compacting roller will induce tiny cracks; crews will then lay asphalt over this bottom layer. The new treatment also promises to improve pavement recycling procedures. Read the article in the *Engineering News-Record* at http://enr.ecnext.com/free-scripts/comsite2.pl?page=enr_document&article=netrar050321b.

Operating/Optimizing the System

FHWA Guidance on Traffic Signal Asset Management

A recent study funded by FHWA's Office of Operations takes asset management systems beyond infrastructure to traffic signal systems, where they have the potential to increase efficiency in resource use and provide decision support for managers. Based on a survey of 26 agencies and in-depth follow-up interviews with WisDOT and Minnesota DOT, the report outlines the key elements and benefits of signal system asset management systems. See http://ops.fhwa.dot.gov/publications/fhwa_signal_system/fhwa_signal_system.pdf.

Keeping Night Workers Safe

To keep construction workers on the night shift safe, the Nova Scotia Department of Transportation and Public Works used two NCHRP studies and input from other DOTs to create state-of-the-art specifications for night work. In its first application of the specifications on a 10-week nighttime paving project, the agency encountered no worker safety incidents and no motorist complaints. The specifications are continually updated as the department gains experience working in the wee hours. Read more in *TR News*' "Research Pays Off" at <http://gulliver.trb.org/publications/trnews/trnews236rpo.pdf>. Courtesy of the TRB E-Newsletter.

UK Switching to Safer Signposts

A collision with a road sign can cause serious injury to drivers and their passengers, as well as significant damage to vehicles. Great Britain's Highways Agency is addressing this problem with new signposts that bend or break when hit. Test results have shown the posts cause less damage to vehicles than the safety barriers currently installed in front of most signs. Read the press release at <http://www.highways.gov.uk/news/articles/8034149.htm>.

Safe Travel/Smart Travel

Smart Traffic Signs Cut Crashes in Maine

In an effort to reduce accidents, Maine DOT is using smart signs that light up as a vehicle approaches to warn motorists of other traffic, sharp curves and other hazards, particularly where drivers' views are obscured. Sensors recognize approaching vehicles, triggering a sudden flash of lights on traffic signs that might be ignored if they flashed constantly. Read the article in the *Portland Press Herald* at <http://pressherald.maine.com/news/state/050321signs.shtml>.

Freight Route Planning Portal Aims to Decrease Congestion

Great Britain's Highways Agency is sponsoring the development of a one-stop, Web-based portal for assisted freight route planning and automated notification of abnormal load movements in the UK. The portal will enable haulers of wide, heavy, long or high loads to map a route that minimizes the potential for causing traffic congestion or damaging roads or structures. Read the press release at <http://imgs.intergraph.com/newsroom/pressrelease.asp?id=573>.

Montana 511 Integrates Weather Information Systems

Motorist satisfaction with Montana's road information services increased 10 percentage points after the state introduced a 511 system featuring interactive weather information. The system integrates a wireless en route weather information system with a pavement temperature model, enabling travelers to receive site-specific predictive weather information using a wireless phone, land line or Internet connection. See the ITS Benefits and Costs Database at <http://www.benefitcost.its.dot.gov/its/benecost.nsf/ByLink/BOTM-March2005>.

Teen Driving Laws Saving Lives

Restrictions and requirements for new drivers younger than 18 have improved traffic safety since Oregon's Graduated Driver Licensing Program began in March 2000, according to a study sponsored by the National Highway Transportation Safety Administration. The study cites safety benefits including declining crash rates. Read the article from Eugene's KVAL-TV at <http://www2.kval.com/x30530.xml?ParentPageID=x2649&ContentID=x49635&Layout=kval.xsl&AdGroupID=x30530>.

Factoring in Motorcycles

With more motorcycles tooling along UK roads, the government has outlined a strategy for facilitating motorcycling as a choice of travel within a safe and sustainable transport framework. The initiatives include smarter traffic management. Read the report at http://www.dft.gov.uk/stellent/groups/dft_roads/documents/page/dft_roads_035439.pdf.